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denied them. Our speculative friend asks, "may it not be that man, driven from the northern lands by the coming of his higher successor on the stage of life, is to finally end his race on earth within the recesses of the gloomy forests of Brazil or Borneo?"

THE MOLLUSKS OF OUR CELLARS.

BY W. G. BINNEY.

MOST of the readers of the *NATURALIST*, who reside in the cities of our Atlantic coast, are aware that the cellars of their houses are infested with slugs and snails. They have seen or heard of the glistening tracks made by their slime, and have heard dreadful stories of the ugly creatures who left them when escaping from their nocturnal depredations. But as few of our readers have met them face to face, we propose giving a short description of each with a portrait of sufficient accuracy to enable any one to identify the separate species.

A word first about their characters and habits. They all belong to the great division of mollusks which are called *Pulmonata*, from the fact of their breathing with lung-like vessels. Furthermore, they all belong to that group of *Pulmonata* which are called *Geophila*, or lovers of dry land, from the fact of their habits being terrestrial in distinction from those which are adapted to living in fresh-water, or in the sea. These *Geophila* are distinguished in addition to their breathing with lung-like vessels by their having their eyes at the end of long, slender, cylindrical feelers. Thus far most authors agree, but in subdividing these *Geophila* into natural groups there is so little accord among naturalists that we do not carry our readers farther in classification. Suffice it to say that literally from head to tail almost every

character has been seized to found families upon, and thus far the conchological world is but little the wiser for it.

Our cellar mollusks are all nocturnal in their habits. They lie quietly stowed away in some crack or crevice of the walls during the day. At night they sally forth in pursuit of food and to enjoy the company of their kind. They feed on vegetable matter—refuse from the kitchen, decaying vegetables or fruits—or on Indian meal, flour, or anything they are lucky enough to find. They even devour animal food, and in confinement have even been accused of cannibalism. When one comes to know how well adapted their mouth is to eating, it becomes a wonder that our mollusks leave anything uneaten. For the mouth of each individual mollusk is

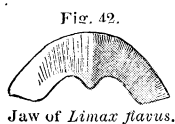
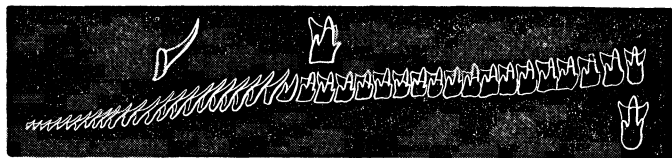


Fig. 43.

Half row of teeth of *Limax flavus*.

armed at its entrance with a sharp, stout, pointed process, called a jaw, for want of a better term. This falls, portcullis-like, on the food of the animal, and cuts off pieces into his mouth. We give here a figure of the jaw of *Limax flavus* one of the species mentioned below (Fig. 42). Once in the mouth the food is taken hold of by a long, broad, ribbon-like membrane, generally called a tongue. The whole surface of this tongue is covered with sharp, tooth-like processes running in transverse rows. These small, sharp teeth rasp quickly the food and carry it forwards towards the stomach. Short work they must make of it, for the number of these tooth-like processes is very great, counting as high as eighty thousand in some species. We give here a figure of one-half of one transverse row of teeth on the tongue of the same species whose so-called jaw is already figured (Fig. 43). To

understand the figure it must be borne in mind that the remaining half of this transverse row is similar to the half figured, and that all the transverse rows are alike. Thus our figure gives as good an idea of the tongue as if the whole hundred rows of eighty-five teeth each were given. No wonder the possessors of all these teeth have a reputation for voracity and that their presence is dreaded in kitchen gardens.

Our cellar mollusks are active all the year round, owing to the milder and more equal climate of their abode. They do not hibernate like their brethren of the fields and woods. Their soft shell-less body gives them little protection from their enemies. Like all animals so defenceless they would soon become exterminated had they not great powers of reproduction. They lay eggs several times during the year, and in such numbers that a couple of them will lay as many as six hundred in a year. These eggs are gelatinous, semitransparent and globular, sometimes attached together like a rosary. They are remarkably tenacious of vitality, so much so that they resist the greatest extremes of temperature. They have even been shrunk and dried in a furnace and kept for years in this state, yet still have developed their young upon being restored to moisture. The young animal emerges from the egg in about a month, and when two months old begins to reproduce its kind, though not itself arrived at more than half its greatest size.

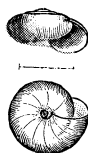
Only one species of our cellar mollusks is furnished with an external well developed shell. The others are what are commonly known as *slugs*. They have, however, under the skin of the forepart of their body, called the mantle, a rudimentary shell, either in grains of calcareous matter or in a regular calcareous plate. This plate was formerly supposed to have great medicinal properties, and has been said to be a sovereign remedy for almost all the ills that flesh is heir to.

The whole surface of their body is constantly lubricated by a watery fluid. They also have the power of secreting a

milk-like mucus at any part of their body which may require protection from any foreign substance. This secretion of mucus is their only means of defence against their enemies. It also is used as a thread like the spider's web to enable them to descend to the earth.

All the species mentioned below are of foreign origin. They were imported from England. They are found only in close proximity to man around his habitation, either in cellars or gardens. Most of them were noticed more than half a century ago, as early as mollusks became to be studied in our country. They have also been imported into other colonies of England, and probably are destined to become the most cosmopolitan of mollusks.

Fig. 44.

Shell of *Hyalina cellaria*.

We will now describe the various species found in our cellars, commencing with the only one which bears a well developed external shell (Fig. 44). This is the *Hyalina cellaria*, a thin, horn colored, glistening, flattened shell of five whorls, and less than half an inch in diameter. The edge of the aperture is sharp, not reflected, or thickened by a border of testaceous matter. It is a common European shell of which a single specimen was first noticed by a gentleman in Philadelphia on a wharf near the foreign shipping. It was shown to Mr. Say, who described it as a new species. Of late years it has not been seen in that city, but from Astoria, Long Island, to Halifax, it exists in almost every Atlantic port. It is found only in cellars and gardens. It used to be very common under the bricks of the inner edge of the sidewalk on the north side of Mount Vernon street, Boston, between Walnut street and Louisberg Square.

Fig. 44a.

Animal of *Hyalina cellaria*.

Limax maximus is the largest of our cellar slugs (Fig. 45). It seems to be a more recent importation than the other species, having first been noticed in Philadelphia in 1867. It appeared almost simultaneously at Brooklyn, New York, and

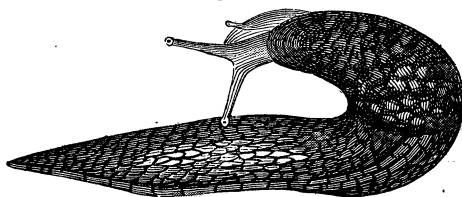
at Newport, R. I. The individual figured was found in a garden in Pelham street of the last named city. Some indi-

Fig. 45.

*Limax maximus.*

viduals placed in a garden in Burlington, New Jersey, were shortly after found in an adjoining cellar. This species is readily distinguished by the rich brown or black stripes

Fig. 46.

*Limax flavus.*

running lengthwise down its back, giving it a leopard-like appearance. It is about four inches long.

Limax flavus, whose tongue and

jaw are figured above, grows about three inches long (Fig. 46). It is characterized by a brownish color, with oblong-oval uncolored spots; body cylindrical, elongated, terminating in a short prominent keel; mantle oval, rounded at both ends, with rounded spots; base of foot sallow white. It has been noticed for more than forty years in the cities of our Atlantic coast, and probably has followed the white man over the whole country.

Fig. 47.

*Arion fuscus.*

Arion fuscus belongs to a different genus from the last named slugs (Fig. 47). It is readily distinguished by its

jaw which has no median beak-like projection to its cutting edge, but has rib-like processes on its anterior face, crenulating the margin. Its tongue differs also in the form of the teeth. In the forepart of its body, under the rounded shield-like process of the skin, there are calcareous grains instead of a well formed plate. And finally at its tail is a decided triangular perpendicular mucus pore. It grows about one inch long. The color is whitish, grayish or brownish; upper surface marked with elongated crowded glands; mantle oval, granulated; tail obtuse, not carinated; the sides marked with an obscure brownish line. It is of European origin and thus far has only been noticed in Boston and vicinity. It is not properly a cellar snail, but is found with the preceding species around kitchens and gardens.

REVIEWS.

CHALCHIHUITLS. *—[Mr. Squier has in this communication to the Lyceum given a very important and interesting summary of what is known relating to the carved "green stones" from Mexico and Central America, and as he has kindly placed the original cuts of the article in our hands, we make this review in the form of extracts from his communication. In a future number we shall give figures of a few similar carved stones collected by Mr. McNiel in Nicaragua.]

"Among the articles of ornament used by the aboriginal inhabitants of Mexico and Central America, those worked from some variety of green stone resembling emerald, and called by the Nahuatl or Mexican name *chalchiuittl*, *chalchihuittl*, or *chalchiuite*,† were most highly esteemed, and are oftenest mentioned by the early explorers and chroniclers. The word *chalchiuittl* is defined by Molina, in his *Vocabulario Mexicano* (1571), to signify *esmeralda baja*, or an inferior kind of emerald. The precious emerald, or emerald proper, was called *quetzalitzli*, from the *quetzal*, the bird known to science as the *Trogon resplendens* (the splendid plumes of which, of brilliant metallic green were worn by the kings of Mexico and

* Observations on a Collection of Chalchihuitls from Mexico and Central America. By E. G. Squier. From the Annals of the Lyceum of Natural History of New York. 1869.

† I have followed the orthography of the word throughout, as given by the various authors quoted.